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TECHNICAL MANUAL

INSTRUCTIONS AND PARTS BREAKDOWN

FOR

ELECTRON TUBE TEST SET

HICKOK
MODEL 1575

(HICKOK)

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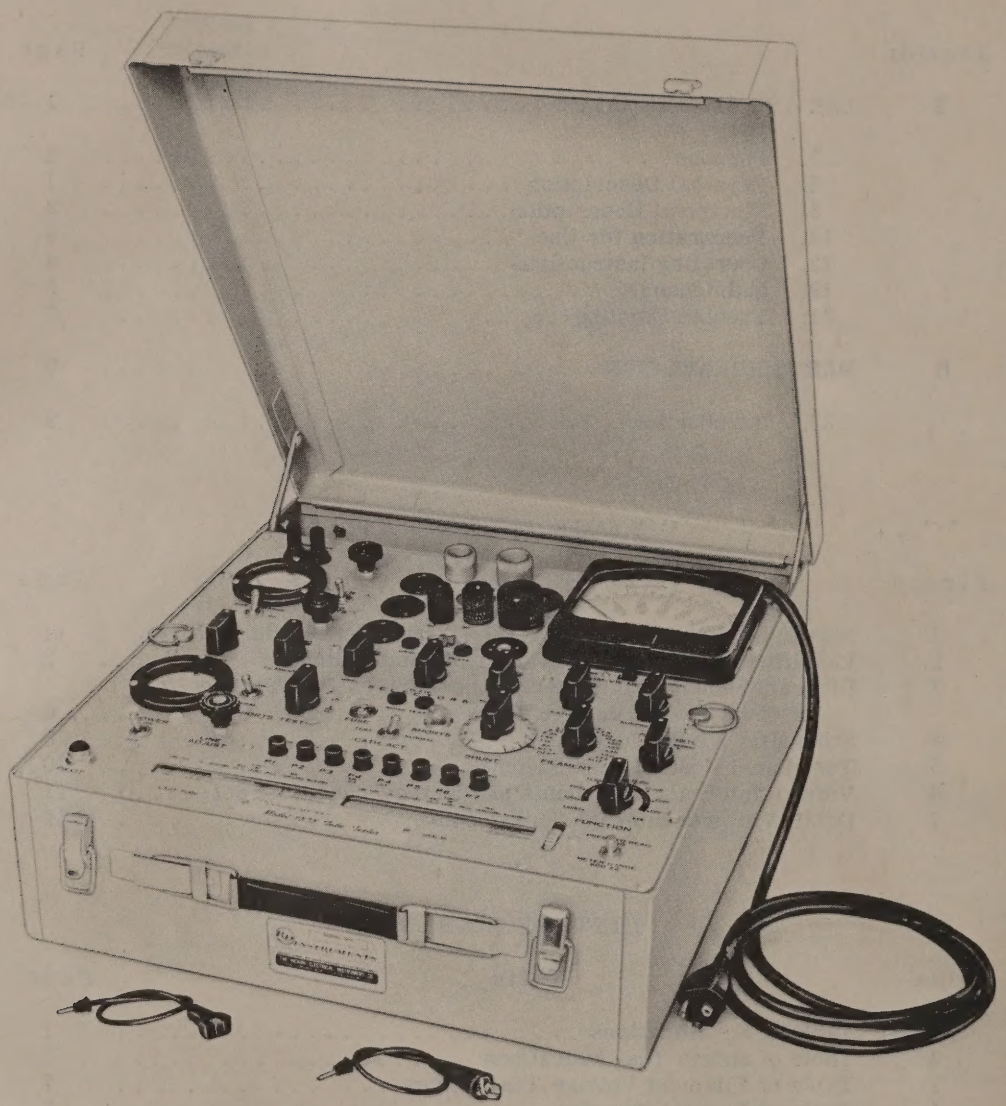

Figure 1. Identifying View of Electron Tube Test Set, Model 1575

SECTION I
USE AND MAINTENANCE

1. PURPOSE.

a. GENERAL. The model 1575 Electron Tube Test Set manufactured by the Hickok Electrical Instrument Company, Cleveland, Ohio, is designed to provide an accurate method of testing electron tubes. (See figure 1 for an identifying view of the instrument.)

b. The instrument will be referred to hereafter as the electron tube tester. Dynamic tests are performed under conditions which are as close to the operating condition of the tube as possible. The mutual conductance of the tube under test is indicated on the GM-VR meter scale directly in micromhos.

2. PHYSICAL DESCRIPTION.

a. The electron tube tester is self-contained in a grey, portable, aluminum carrying case. The carrying case is equipped with a handle, two quick-snap fasteners and split hinges. The split hinges provide for easy removal of the top cover and immediate access to the control selectors. Above the mutual conductance meter is a compartment for line cord, instruction booklet and any supplementary tube information storage (see figure 1). Refer to table 1 for a condensation of principal features of the electron tube tester.

Transconductance Meter Ranges (Micromhos)	
	0 to 3000; 0 to 6000; 0 to 15000; 0 to 30000, 0 to 60000; 0 to 600
Line Test Meter Range	0 to 130 VAC
Grid Bias Meter Ranges	0 to 5 and 0 to 50 VDC
Test Sockets	ten
Pin Straighteners	7 and 9 pin
Power Source	115 VAC, 60 cycle, single phase
Filament Voltage Range	0.6 to 117 VAC in 18 steps
Dimensions	
Width	16 inch
Length	17-5/8 inch
Height	7 inch
Weight	27.0 pounds
Accessories	
Grid Test Load	one
Plate Test Load	one
Instruction Book	one

Table 1. Table of Specifications

b. A data roll chart located on the lower end of test panel contains an up-to-date listing of all tubes that can be tested on this electron tube tester. It lists the proper settings for controls, specified test readings for each tube and any special notations required for certain tubes of non-standard design.

c. The GM-VR meter has an upper scale for voltage regulator tubes and mercury vapor tubes. A special scale is provided for vacuum tube diodes. The lower portion of the meter has six calibrated scales for transconductance readings. A slide switch is incorporated below meter for use in testing certain types of electron tubes requiring reversed meter polarity (see figure 2).

d. A three-scale BIAS RANGE meter on upper left side of test panel has an upper 50 MA scale and two lower DC scales, one of which is calibrated for 5 volts DC, the other for 50 volts DC. A toggle switch below meter selects the desired DC voltage scale. A toggle switch to the right of meter selects the VR-MA (voltage regulator current) range in the upper position and BIAS volts DC on the lower position. A variable BIAS VOLTS control is below this switch.

e. In upper center of the test panel are eleven different types of tube sockets. GRID and PLATE terminal jacks are located below tube sockets for top grid and plate connections of various electron tubes. Two special grid and plate test leads (see figure 3) are furnished for this purpose. Above the sockets are two pin straighteners for seven and nine pin miniature electron tubes.

f. A row of selector switches horizontally mounted across middle of the test panel is used to select proper socket connections for the elements of the electron tube under test. On each side of the selector switches is a lift ring for easy removal of the instrument for inspection.

g. A LINE ADJUST control will compensate for variations in line voltage. An AC line meter is provided with a red indicating mark for correct settings of line voltage. Two terminal jacks are located below meter for calibration purposes.

h. A six position SHORTS TEST switch, used in conjunction with a LOW-NORMAL toggle switch and neon lamp, tests for shorts or leakage between various elements of the electron tube. NOISE TEST jacks are provided for sensitive noise tests on electron tubes.

i. A cathode activity (CATH ACT) two-position switch is provided for making "life tests".

j. The SHUNT control works in conjunction with the FUNCTION switch for tests designated on roll chart. The FUNCTION switch also selects desired range on GM-VR meter. A FILAMENT switch sets the proper filament voltage designated on roll chart.

k. A row of push button test switches are identified with letter "P" and numbered 1 through 7. Two

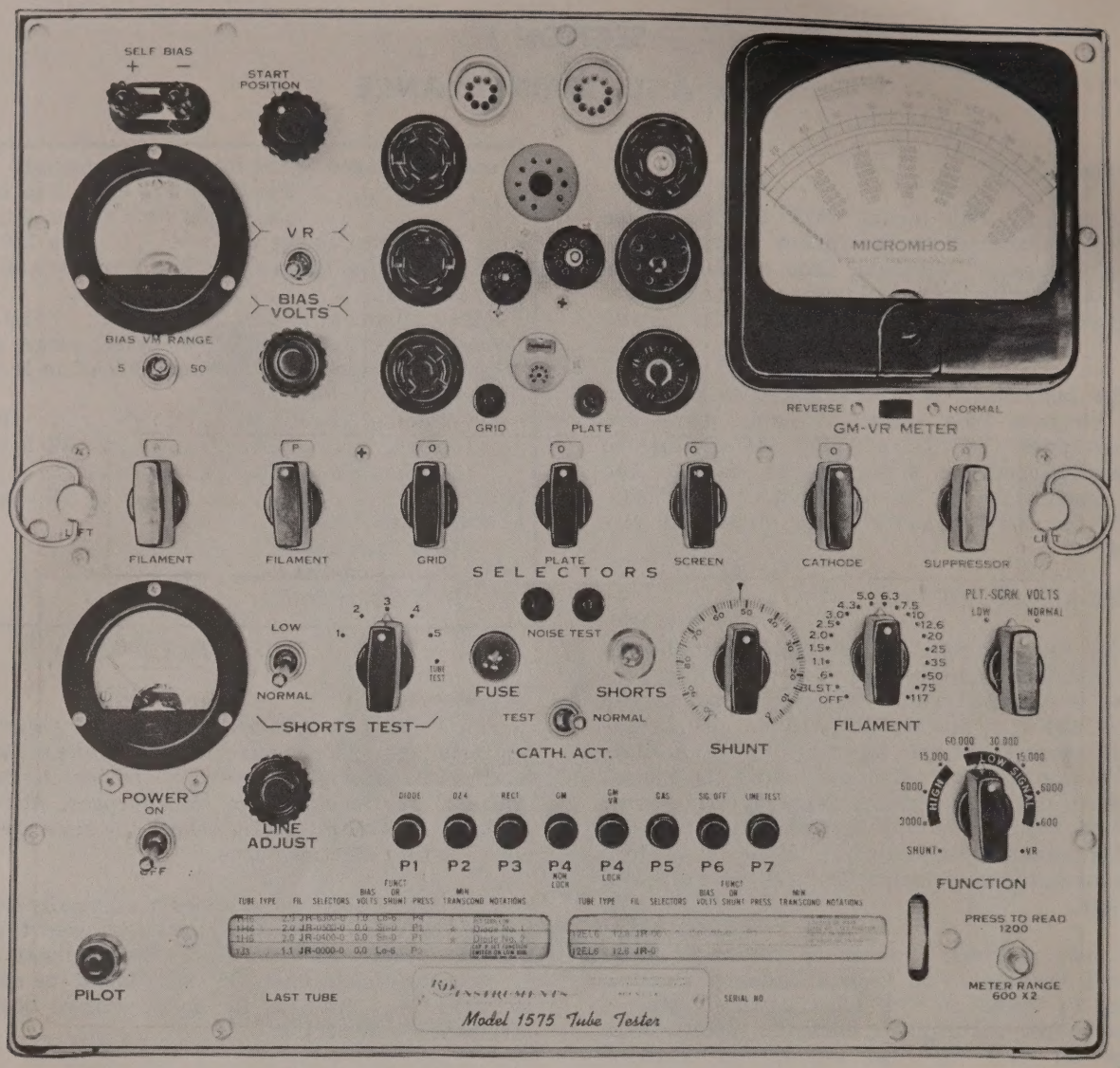

Figure 2. Identification of Test Panel Controls and Switches

"P4's" are identical switches with the exception that one is labeled P4 LOCK. When P4 LOCK is pressed it locks in place. The GM-VR meter is connected in the circuit while P4 is locked. This enables the operator to make accurate voltage regulator tests as well as "life tests". To release P4, press P4 NON-LOCK. The correct push button(s) for each type of tube is listed on the roll chart under column headed "PRESS".

l. An OFF-ON two-position toggle switch applies the AC line voltage to tester. A red pilot lamp below switch indicates when the instrument is "ON" (energized).

m. In the center of tube socket X5 a special receptacle is provided to check pilot lamps of either the screw-type or bayonet base type. To test these pilot lamps, turn the FILAMENT SELECTOR switches to the J and R positions, respectively. The FILAMENT voltage range switch is set to the desired voltage of the lamp. Insert the lamp into receptacle in tube socket X5 for test.

3. ELECTRICAL DESCRIPTION.

a. The circuitry in the electron tube tester is designed to give an accurate evaluation of individual electron tubes under test. Dynamic tests, which supply an AC signal voltage to the grid and a DC voltage to the other elements, register the performance capabilities of the electron tube under actual working conditions.

b. To evaluate voltage regulator gas tubes, a DC voltage is applied gradually to the plate of the tube through a variable control. The ionization point is

registered on the upper scale of large GM-VR meter. The required current of the voltage regulator tube is indicated on the BIAS meter.

c. DC voltages applied to the elements of the electron tubes under test can vary with AC line variations. To overcome any variations, a separate AC voltmeter, along with a LINE ADJUST control, is provided to compensate for such variations.

d. A number 81 bulb is connected in series with the AC supply feeding the filament and high voltage transformers. A shorted tube, where the elements are in direct contact, will cause a reflected load on the transformers and open the filament of the lamp. If electron tube tester is receiving power from a portable power unit, the fuse will protect the tester from overloads if the frequency falls below a certain level.

4. TUBE TESTS.

5. GENERAL. The electron tube tester is designed for the following tests: (1) Short test, (2) Leakage test, (3) Quality test, (4) Gas test, (5) Life test, (6) Noise test, and (7) Special tests.

6. SHORT TEST. Rotating the SHORTS TEST switch through positions 1-2-3-4-5 connects various pins of the tube under test in series with a neon glow lamp and a test voltage. Shorted elements cause the neon lamp to have a steady glow. A high-impedance short will cause the neon lamp to glow intermittently; a low-impedance short will cause a steady glow. The two-position toggle switch used in conjunction with the SHORTS TEST switch should be used in the NORMAL position unless otherwise specified under NOTATIONS on the roll chart. In the NORMAL position 100 volts (peak voltage) is applied, while in the LOW position 50 volts peak is applied. Shorted elements can be located by using table 2. The letter X under any SHORTS TEST switch position indicates that the neon lamp glows in that position.

7. The LEAKAGE TEST shows condition of isolation or leakage between the cathode and filament. A cathode-to-filament leakage may be in the order of 0.7 megohm or higher. To perform test, place SHORTS TEST switch in the number 1 position. The NORMAL-LOW toggle switch should be placed in both positions while observing the SHORTS neon lamp for any glow.

8. QUALITY TEST. The electron tube tester provides various types of circuits for the different types of tubes. Diodes are tested under one condition while a different circuit is used to test rectifiers. Amplifiers are tested by applying an AC voltage to the grid and reading the change in plate current in micromhos on the transconductance meter. The proper settings for the specific type tube to be tested are listed on the data roll chart.

9. GAS TEST. The gas test is performed to show the condition of the vacuum. Gas in the tube or poor filament-to-grid insulation causes a current to flow in the grid circuit. A transconductance test is made in the usual manner; but, using P4 lock, P5 push switch is then operated. This transfers connections to the MICROMHOS meter from the plate connection of the tube to the control grid connection of the tube. Grid current, if any, is thus measured in microamperes. While P5 switch is pressed, P6 is simultaneously pressed to remove the grid signal voltage which might produce false readings. In this test the MICROMHOS meter is used as a DC microammeter in series with grid circuit and will read about two microamperes per small scale division.

KIND OF SHORT	1	2	3	4	5
HEATER to CATH.	X				
HEATER to GRID	X	X			
HEATER to SCRN.	X	X	X		
HEATER to PLT.	X	X	X	X	
HEATER to SUP.	X	X	X	X	X
CATH. to GRID		X			
CATH. to SCRN.		X	X		
CATH. to PLT.		X	X	X	
CATH. to SUP.		X	X	X	X
GRID to SCRN.			X		
GRID to PLT.			X	X	
GRID to SUP.			X	X	X
SCRN. to PLT.				X	
SCRN. to SUP.				X	X
PLT. to SUP.					X

Table 2. Table of Shorts Test Indications

10. LIFE TEST. The electron tube test set provides a cathode activity test circuit which is controlled by means of a two-position toggle switch marked NORMAL and TEST for each position. A transconductance test is made with the CATHODE ACT switch in the NORMAL position. The CATHODE ACT switch is then placed in the TEST position which reduces the filament voltage by ten percent of its value. The mutual conductance reading should not drop more than 20 percent.

11. NOISE TEST. The short test circuit is also used in making noise tests on vacuum tubes. Connections are made from the NOISE TEST jacks to the antenna and ground posts of any radio receiver. The tube under test is tapped with the finger as the SHORTS TEST switch is turned through positions 1-2-3-4-5. Intermittent disturbances which are too brief to register on the neon SHORTS lamp will be reproduced by the loud speaker as static.

12. SPECIAL TESTS. The electron tube tester has provisions to test voltage regulator tubes such as OA2, OA3, OB3, OD3, as well as thyratron tubes. To perform these tests, the two-position toggle switch on the right hand side of the BIAS meter is placed in the VR position. The START POSITION control is placed in the START position. Switch P4 LOCK is placed in LOCK position. The START POSITION knob is rotated slowly clockwise until a maximum reading on the 200 volt scale of the GM-VR meter will cause the voltmeter to drop back, indi-

cating the sustaining voltage condition. The high reading indicates the striking point. A reading on the upper scale of the BIAS meter will indicate the plate current of the tube.

13. PREPARATION FOR USE.

a. To unpack electron tube tester, place carton on end so that the manufacturer's name is in the upright position on side of carton. Open top end of carton exposing the handle of the carrying case. Lift case out of carton and place upon a sturdy table or bench close to a 115 volts, 60 cycle AC outlet. Ventilation and lighting should be taken into consideration.

b. Release the snap-fasteners so that the cover can be raised. To remove cover, merely slide cover to the right while it is in the raised position. Inspect test panel visually for any damage that might occur through transportation.

CAUTION

Since the electron tube tester is a precision electronic instrument, any rough or unnecessary handling may seriously damage tubes, meter, or other components.

c. Connect the line cord to a 115 volt, 60 cycle AC source, making sure that the third prong (which is the round prong of the male plug of line cord) is properly grounded. Check to see if fuse and neon lamps are properly locked in their sockets.

14. CALIBRATING ELECTRON TUBE TESTER. The electron tube tester circuitry is designed and tested at the factory so that no special calibration procedures are required prior to operation of the equipment.

15. OPERATING INSTRUCTIONS.

16. GENERAL. Before turning POWER switch to ON position, the operator should familiarize himself with the various switches, controls, and read the information at the beginning and end of the data roll chart. The data roll chart should be turned to the last tube on the left side column of roll chart and the type of tube should be written in pencil on the blank space to the right of LAST TUBE on bottom portion of test panel. This is to speed up operation in locating different types of tubes to be tested.

17. SETTING CONTROLS AND SELECTOR SWITCHES. The electron tube to be tested should be identified on the data roll chart. Control settings must be made in strict accordance with the chart.

a. The FILAMENT switch should be set to the required voltage. The selector switches should be placed to the correct settings. The BIAS VM RANGE switch is placed in the range specified on the data roll chart.

NOTE

When symbol on data roll chart indicates self bias, the shorting strap across the SELF BIAS + - is removed and the correct value of resistor under NOTATIONS should be inserted for self bias.

CAUTION

Whenever a self-bias resistor is not required the shorting strap must be placed across the SELF BIAS terminals.

b. The following switches should be placed in the NORMAL position, unless otherwise stated on data roll chart: GM-VR METER switch, CATHODE ACT., PLT.-SCRN. VOLTS, and SHORTS TEST. The five position SHORTS TEST switch should be placed in the number 1 position.

c. The FUNCTION switch is placed to the setting called for on the roll chart. This switch selects one of the six ranges of transconductance to be read. Used in conjunction with the FUNCTION switch is the METER RANGE 600 X2 switch. Placing the FUNCTION switch on the 600 setting and pressing METER RANGE 600 X2 switch changes the 600 scale into a 1200 micromhos scale by miltiplying the readings by two.

18. PERFORMING TESTS. Insert tube in proper test socket.

NOTE

When testing miniature 7 and 9 prong tubes, always place tube in pin straightener first, as this will prolong life of miniature test sockets.

a. Turn LINE ADJUST control until AC voltmeter registers 100 volts AC. If actual line voltage is desired, press P7 LINE TEST. This shunts the LINE ADJUST and places AC voltmeter across AC power source.

b. Set BIAS VOLTS control for the correct DC voltage specified on roll chart.

c. Rotate SHORTS TEST switch through its five positions and watch neon SHORTS lamp. If neon glows steady on any position, the tube is shorted and no further tests should be made. Remove tube from tester and discard it if it is faulty.

d. Press switch designated on roll chart and read GM-VR METER scale to which FUNCTION switch is set. The correct evaluation in micromhos on roll chart then can be compared with meter reading.

e. When testing voltage regulator tubes such as OA2, OA3, OB3 and OD3, turn roll chart to type of tube to be tested. Set first filament selector to position A and the second filament selector to position P. These two settings are for zero filament voltage. The balance of selector switches are set in accordance with the numbers on roll chart. Place toggle switch at

right of BIAS meter in VR position. Place FUNCTION switch in VR position. Press P4 GM-VR LOCK. Insert tube in correct test socket. Turn START POSITION knob at upper right of BIAS meter in a clockwise position and watch the upper VR scale of the GM-VR meter. When voltage regulator tube "strikes", the voltage will drop to its sustaining voltage condition. The BIAS meter will record the tube current on the upper scale. The evaluation procedure described under NOTATIONS on the data roll chart should be followed.

19. MAINTENANCE.

20. GENERAL. The electron tube tester is so designed that periodic lubrications or electrical adjustments are not required. As a protective measure, it is advisable to keep the cover closed when the tube tester is not in use.

21. PERIODIC CHECKS. After long periods of usage it is advisable to make a few simple voltage measurements, as explained in paragraph 22, to maintain the electron tube tester at required standards.

22. MEASUREMENT OF VOLTAGES. For the voltage measurement tests set the following controls to the designated settings:

a. FILAMENT selector to J position.

b. FILAMENT selector to R position.

c. GRID selector to number 5 position.

d. PLATE selector to number 3 position.

e. SCREEN selector to number 4 position.

f. CATHODE selector to number 7 position.

g. SUPPRESSOR selector to 0 position.

h. SHORTS TEST switch to TUBE TEST.

i. FUNCTION switch to HIGH 3000.

j. FILAMENT switch to 6.3 VOLTS.

k. PLT.-SCRN. VOLTS switch to NORMAL.

l. CATHODE ACT. switch to NORMAL.

m. BIAS switch to BIAS VOLTS.

n. BIAS VM RANGE switch to 50 volt RANGE.

o. P4 LOCK switch to press to lock position.

p. Turn POWER switch ON.

q. Rotate the LINE ADJUST control until the AC VOLTS meter reads 100 volts (at red TEST line). The adjustment of this control must be maintained at a point which will cause a reading of 100 volts during the following tests.

NOTE

All plate, screen and grid bias voltage measurements should be made using standard volt meters of suitable ranges and having an accuracy of 1/2 percent and sensitivity of 1000 ohms per volt, such as the Hickok Model 18, or equal.

23. PLATE VOLTAGE.

a. NORMAL. With PLT.-SCRN. VOLTS switch set at NORMAL position measure DC plate voltage between pin 6 of the octal test socket X10 (-) and the red PLATE jack J3 (+) (see figure 3, "A" portion). The DC voltmeter should read 152 volts plus or minus 4 volts.

b. REDUCED. Turn the PLT.-SCRN. VOLTS switch to LOW position. The reduced plate voltage should read 67 volts plus or minus 2 volts.

24. SCREEN VOLTAGE.

a. NORMAL. With PLT.-SCRN. VOLTS switch set at NORMAL position measure DC screen voltage between pins 3 (+) and 6 (-) of octal test socket X10. (See figure 3, "B" portion.) The DC voltmeter should read 132 volts plus or minus 3 volts.

b. REDUCED. Turn PLT.-SCRN. VOLTS switch to LOW position. The reduced screen voltage should read 66 volts plus or minus 2 volts.

25. GRID BIAS VOLTAGE. With the controls set as described in paragraph 22, grid bias voltage should be measured as follows:

a. FIFTY VOLT RANGE: With the BIAS VM RANGE switch set in the 50 position measure DC grid bias voltage between pin 6 of the octal test socket (+) and the block GRID jack J2. (See figure 3, "C" portion.) Adjust the BIAS VOLTS control for a reading of 50 volts on the calibration standard meter. The reading on the GRID BIAS DC VOLTMETER should not vary more than plus or minus 2 percent from the reading of the calibration standard.

b. FIVE VOLT RANGE. Set the BIAS VM RANGE switch to the 5 position. Adjust the BIAS VOLTS CONTROL for a reading of 5 volts on the calibration standard meter. The reading of the GRID BIAS DC VOLTMETER should not vary from that of the standard meter by more than plus or minus 2 percent.

26. AC GRID SIGNAL VOLTAGE. Turn the BIAS VOLTS control to the extreme counterclockwise position. The GRID BIAS voltage reading on meter M2 should drop to zero.

a. HIGH SIGNAL. Set the FUNCTION switch at a HIGH signal position. Be sure that both P4 push buttons are in the normal (non-operated) position. Measure the AC signal voltage between pin 6 of the octal test socket and the black GRID jack J2. The voltage should be 5 volts (RMS) plus or minus 0.2 volt.

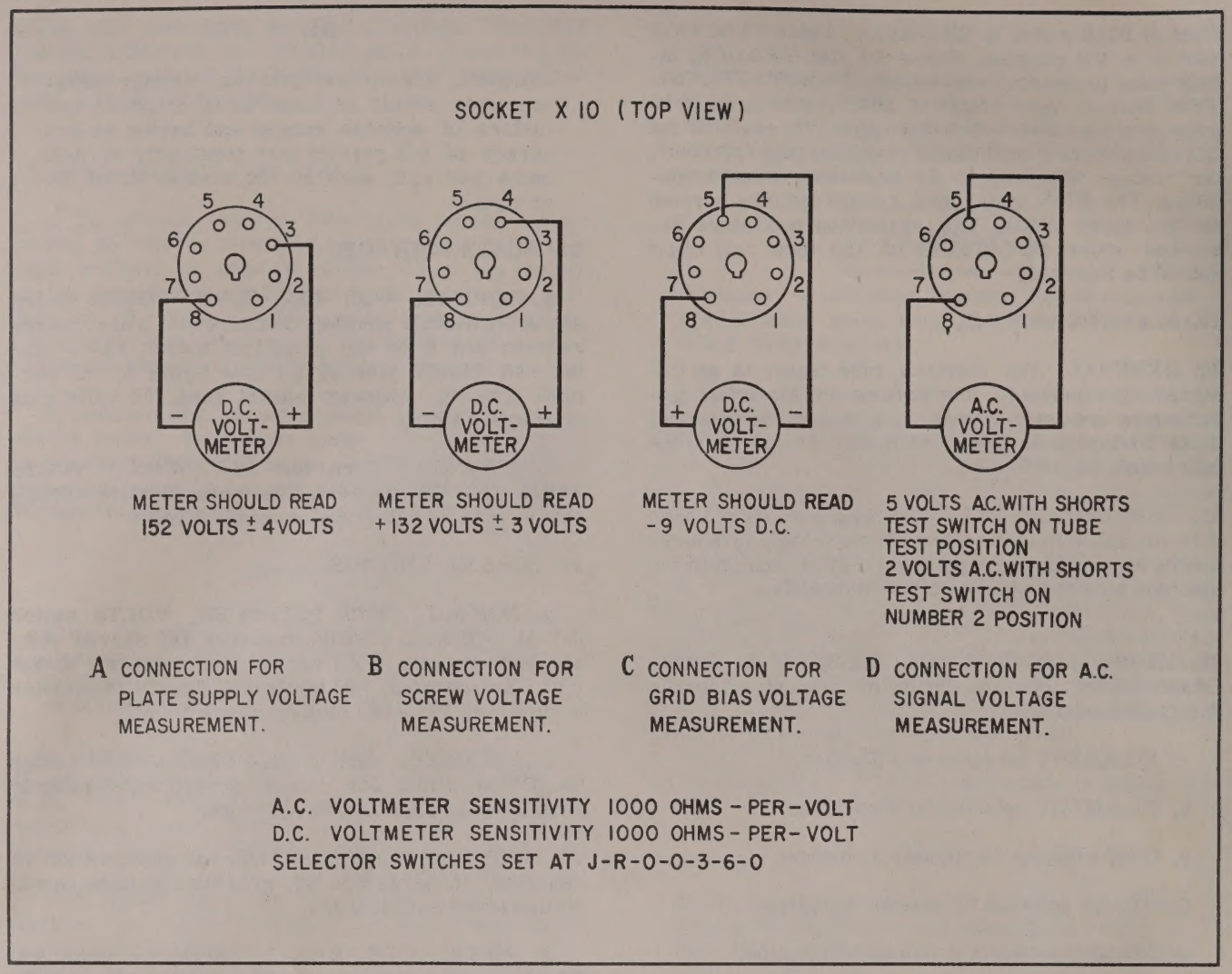

Figure 3. Diagram Showing Voltmeter Connections to Tube Sockets for Tube Tester Voltage Tests

b. LOW SIGNAL. Operate the FUNCTION switch successively through the various LOW SIGNAL positions, beginning with the 15,000 (1 volt), continuing with the 30,000 (0.5 volt) and 60,000 (0.25 volt) switch positions. RMS voltage readings of 1 volt plus or minus 0.05 volt, 0.5 volt plus or minus 0.015 volt and 0.25 volt plus or minus 0.015 volt should be obtained.

NOTE

Signal voltage measurements should be made with an accurate low range AC voltmeter, such as the Hickok Model 1602.

27. FILAMENT VOLTAGE. With the FILAMENT SELECTORS set at J and R measure the AC voltage between pins 2 and 7 of test socket X10 for successive settings of the FILAMENT voltage switch from 0.6 to 117 volts. The readings obtained should fall within the limits listed in table 3.

NOTE

Filament voltages should be measured using the following types of AC meters or equal:

a. For voltages from 0.6 to 12.6 use a Hickok Model 13 Dynamometer Type Voltmeter. Ranges: 7.5 and 15 volts. Accuracy: 3/4 percent of full scale. Internal Resistance: not less than 4 to 6 ohms.

b. For voltages from 15 to 117 use a Hickok Model 13 Iron Vane Type Voltmeter. Range: 0 to 150 volts. Accuracy: 1 percent of full scale. Internal Resistance: not less than 5000 ohms approximately.

28. FILAMENT VOLTAGE TEST. Set FILAMENT selector switches to J and R positions. Place leads of AC voltmeter into pins 7 and 2 of octal socket X10. Rotate FILAMENT voltage range switch through its ranges of standard filament voltages. The mini-

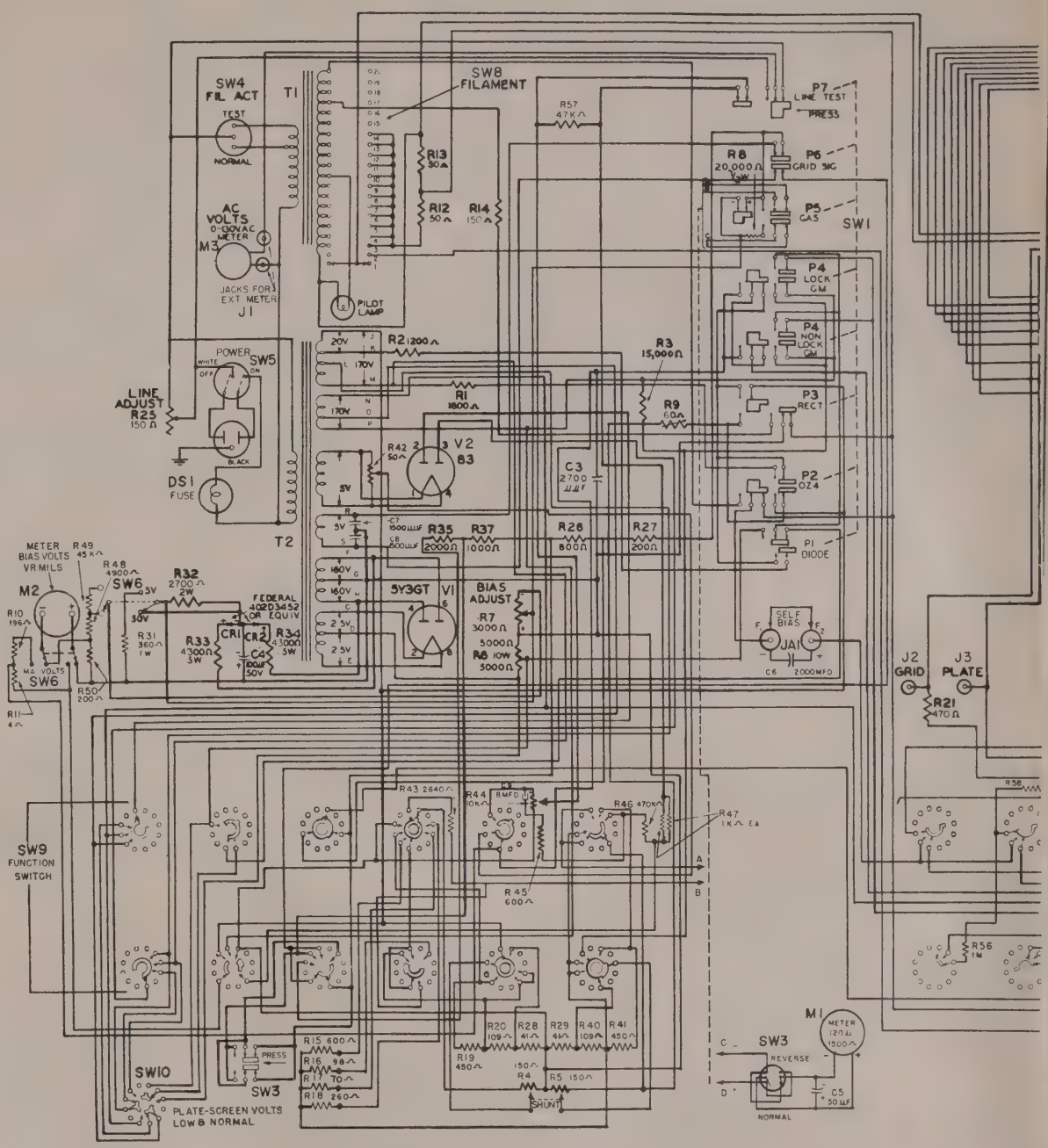

Figure 4. Schematic Wiring Diagram

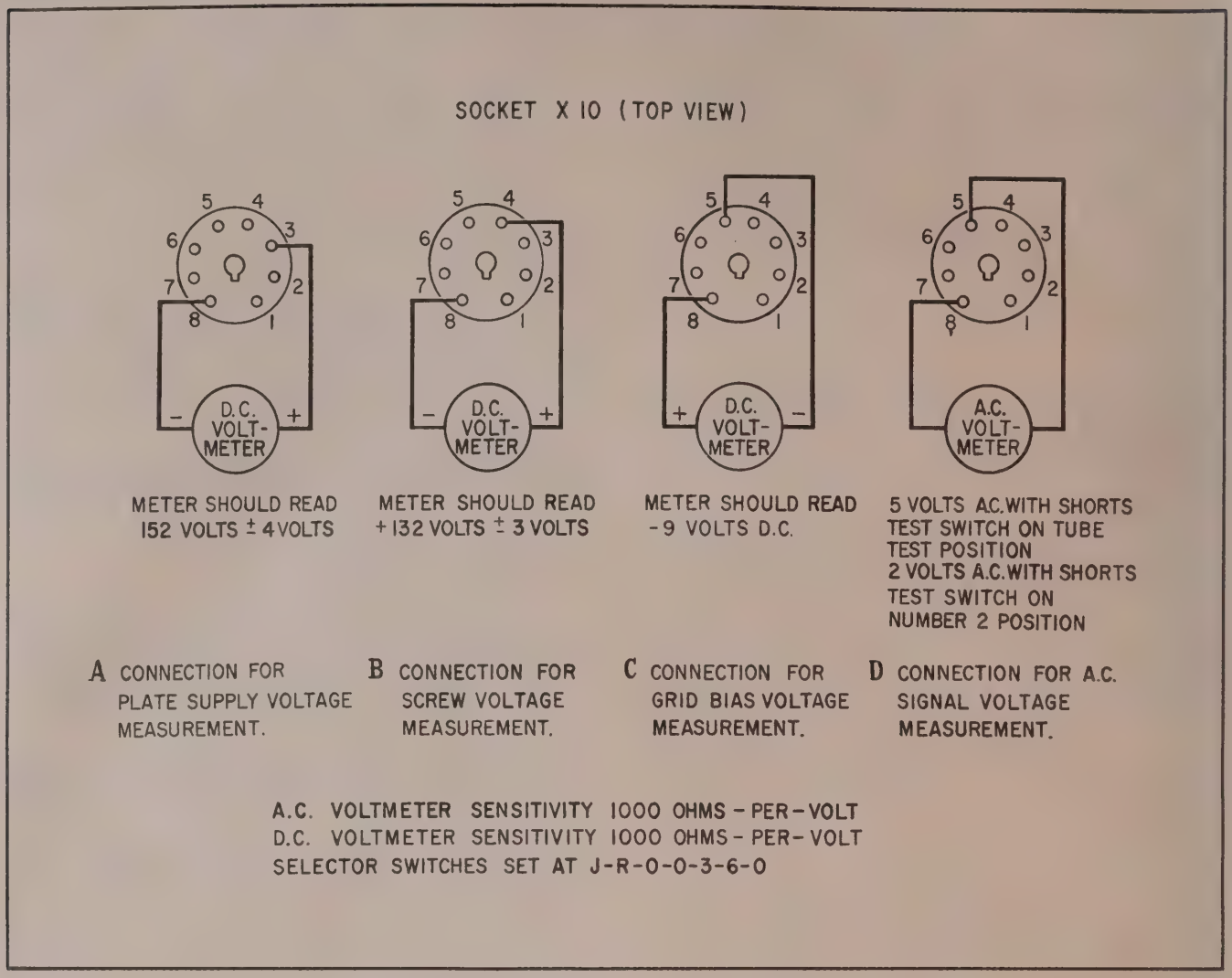

Figure 3. Diagram Showing Voltmeter Connections to Tube Sockets for Tube Tester Voltage Tests

b. LOW SIGNAL. Operate the FUNCTION switch successively through the various LOW SIGNAL positions, beginning with the 15,000 (1 volt), continuing with the 30,000 (0.5 volt) and 60,000 (0.25 volt) switch positions. RMS voltage readings of 1 volt plus or minus 0.05 volt, 0.5 volt plus or minus 0.015 volt and 0.25 volt plus or minus 0.015 volt should be obtained.

NOTE

Signal voltage measurements should be made with an accurate low range AC voltmeter, such as the Hickok Model 1602.

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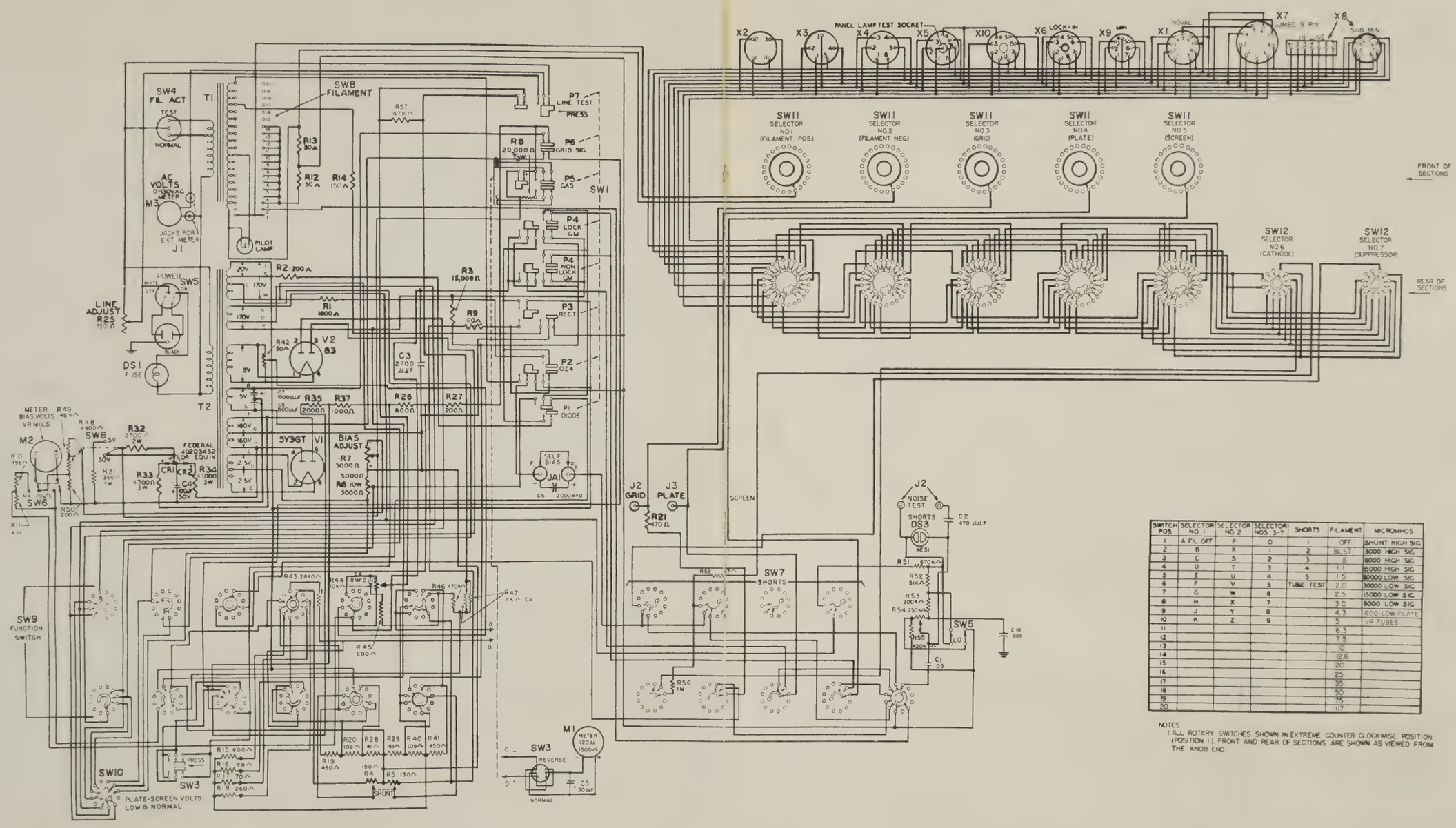
NOTE

Filament voltages should be measured using the following types of AC meters or equal:

a. For voltages from 0.6 to 12.6 use a Hickok Model 13 Dynamometer Type Voltmeter. Ranges: 7.5 and 15 volts. Accuracy: 3/4 percent of full scale. Internal Resistance: not less than 4 to 6 ohms.

b. For voltages from 15 to 117 use a Hickok Model 13 Iron Vane Type Voltmeter. Range: 0 to 150 volts. Accuracy: 1 percent of full scale. Internal Resistance: not less than 5000 ohms approximately.

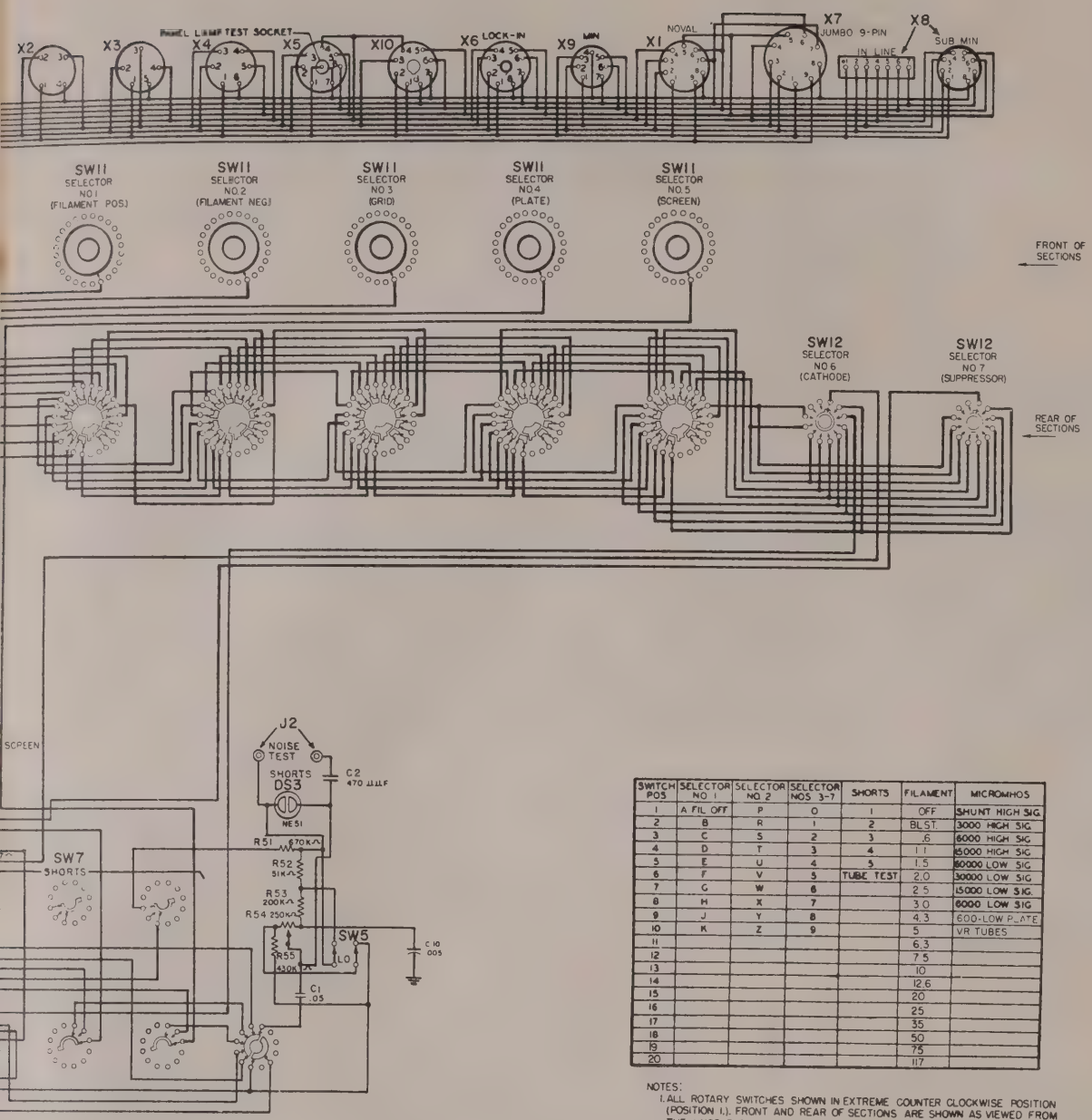
28. FILAMENT VOLTAGE TEST. Set FILAMENT selector switches to J and R positions. Place leads of AC voltmeter into pins 7 and 2 of octal socket X10. Rotate FILAMENT voltage range switch through its ranges of standard filament voltages. The mini-



SWITCH POS	SELECTOR NO 1	SELECTOR NO 2	SELECTOR NOS 3-7	SHORTS	FILAMENT	MICROMHOS
1	A FIL OFF	P	O	1	OFF	SHUNT HIGH SIG.
2	B	R	1	2	BLST	3000 HIGH SIG.
3	C	S	2	3	.6	6000 HIGH SIG.
4	D	T	3	4	1.1	15000 HIGH SIG.
5	E	U	4	5	1.5	30000 LOW SIG.
6	F	V	5	TUBE TEST	2.0	30000 LOW SIG.
7	G	W	6		2.5	15000 LOW SIG.
8	H	X	7		3.0	6000 LOW SIG.
9	J	Y	8		4.3	600-LOW PLATE
10	K	Z	9		5	VR TUBES
11					6.3	
12					7.5	
13					10	
14					12.6	
15					20	
16					25	
17					35	
18					50	
19					75	
20					117	

NOTES:
1. ALL ROTARY SWITCHES SHOWN IN EXTREME COUNTER CLOCKWISE POSITION (POSITION 1.). FRONT AND REAR OF SECTIONS ARE SHOWN AS VIEWED FROM THE KNOB END.

Figure 4. Schematic Wiring Diagram



SWITCH POS	SELECTOR NO 1	SELECTOR NO 2	SELECTOR NOS 3-7	SHORTS	FILAMENT	MICROMHOS
1	A FIL OFF	P	0	1	OFF	SHUNT HIGH SIG.
2	B	R	1	2	BLST.	3000 HIGH SIG.
3	C	S	2	3	.6	6000 HIGH SIG.
4	D	T	3	4	1.1	15000 HIGH SIG.
5	E	U	4	5	1.5	60000 LOW SIG.
6	F	V	5	TUBE TEST	2.0	30000 LOW SIG.
7	G	W	6		2.5	15000 LOW SIG.
8	H	X	7		3.0	6000 LOW SIG.
9	J	Y	8		4.3	600-LOW PLATE
10	K	Z	9		5	VR TUBES
11					6.3	
12					7.5	
13					10	
14					12.6	
15					20	
16					25	
17					35	
18					50	
19					75	
20					117	

NOTES:
1. ALL ROTARY SWITCHES SHOWN IN EXTREME COUNTER CLOCKWISE POSITION (POSITION 1.). FRONT AND REAR OF SECTIONS ARE SHOWN AS VIEWED FROM THE KNOB END.

SECTION II
PARTS BREAKDOWN

33. INTRODUCTION.

34. Reference designations have been assigned to identify all maintenance parts of the equipment. The letters of the reference designation indicate the kind of part (generic group), such as resistor, capacitor, electron tube, etc. The number differentiates between parts of the same group. Parts are numbered from 1 to 99. Sockets associated with a particular plug-in device such as an electron tube, fuse or lamp are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for electron tube V1 is designated XV1 and the fuseholder for fuse F1 is XF1. All reference designations appear in figure 4. Each part is illustrated in either figure 5, 6 or 7 and is identified on the face of the illustration by its reference designation symbol.

35. Each manufactured item, purchased by Hickok, is assigned a code number. The code number is selected from the Federal Supply Code for Manufacturers' Cataloging Handbook H4-1. The code number is placed in parentheses, immediately following the description of the part.

36. The various code numbers used in this manual are listed and identified as follows:

CODE	MANUFACTURER'S NAME AND ADDRESS
01121	Allen-Bradley Co., Milwaukee, Wis.
02660	Amphenol-Borg Electronics Corp., Broadview (Chicago), Ill.
04009	Arrow, Hart and Hegeman Electric Co., Hartford, Conn.
14655	Cornell-Dubilier Electric Corp., South Plainfield, N.J.
15605	Cutler-Hammer, Inc., Milwaukee, Wis.
19701	Electra Mfg. Co., Kansas City, Mo.
21964	Federal Telephone and Radio Co., Division of International Telephone and Telegraph Corp., Clifton, N.J.
24455	General Electric Co., Lamp Division of Consumer Products Group, Nela Park (Cleveland), Ohio
24457	General Electric Co., Wire and Cable Department of Construction Materials Division of Industrial Components and Materials Group, Bridgeport, Conn.
24655	General Radio Co., Cambridge, Mass.
35434	Lectrohm, Inc., Chicago, Ill.
56289	Sprague Electric Co., North Adams, Mass.
71590	Centralab Division of Globe Union, Inc., Milwaukee, Wis.
71785	Cinch Mfg. Corp., Division of United-Carr Fastener Corp., Chicago, Ill.
72125	Hi-Q Division of Aerovox Corp., Franklinville, N.Y.
72765	Drake Mfg. Co., Chicago, Ill.
72825	Eby, Hugh H., Inc., Philadelphia, Pa.
73978	Hardwick Hindle, Inc., Newark, N.J.
74970	Johnson, E.F., Co., Waseca, Minn.
75376	Kurz-Kasch, Inc., Dayton, Ohio
76433	Micamold Electronics Mfg. Corp., Brooklyn, N.Y.
76854	Oak Mfg. Co., Chicago, Ill.
82376	Astron Company, East Newark, N.J.
86684	RCA Division of Radio Corp. of America, Harrison, N.J.
88065	Duro Specialty Co., Inc., West Lynn, Mass.
94154	Tung-Sol Electric, Inc., Newark, N.J.

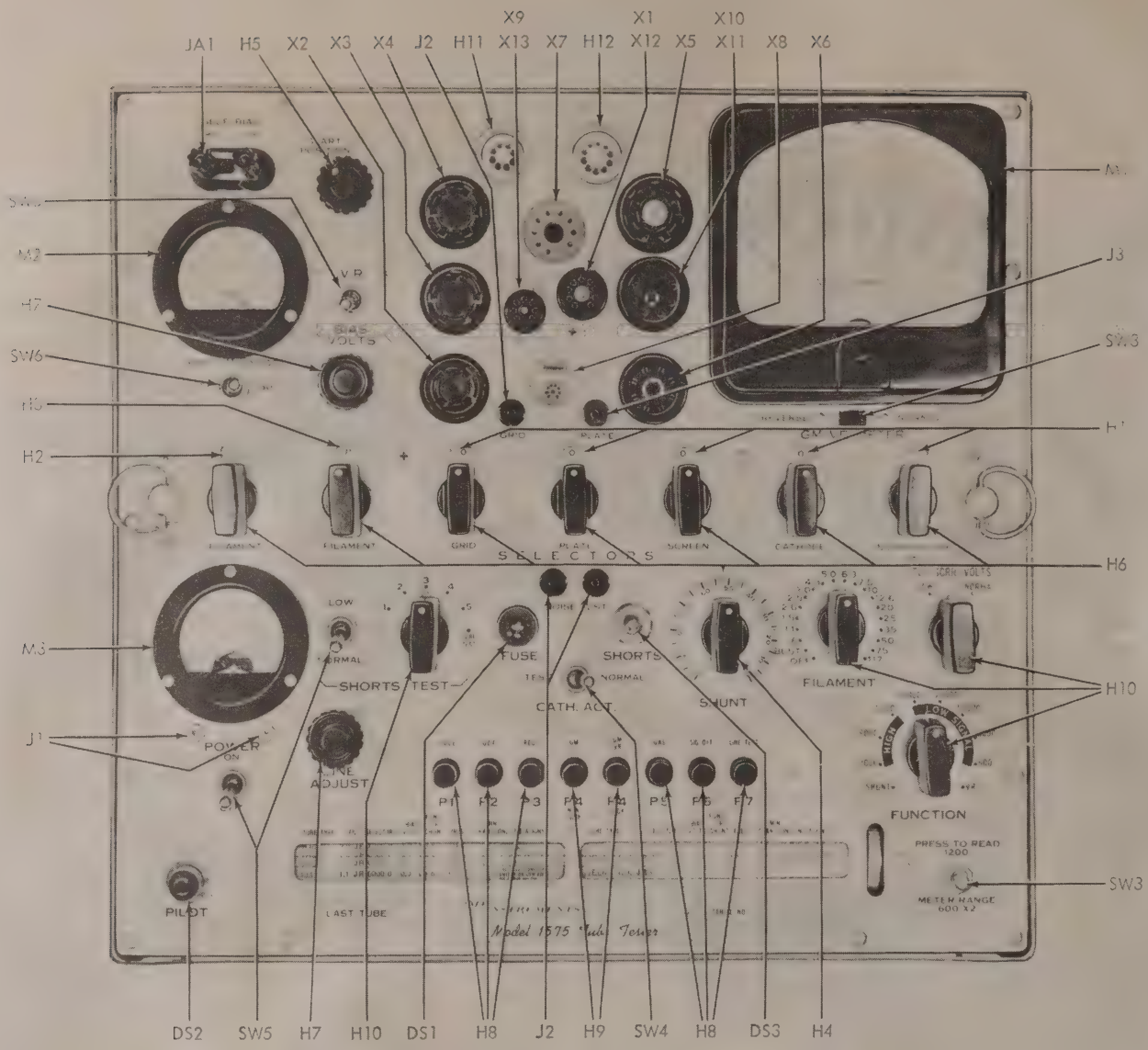


Figure 5. Test Panel Controls and Switches

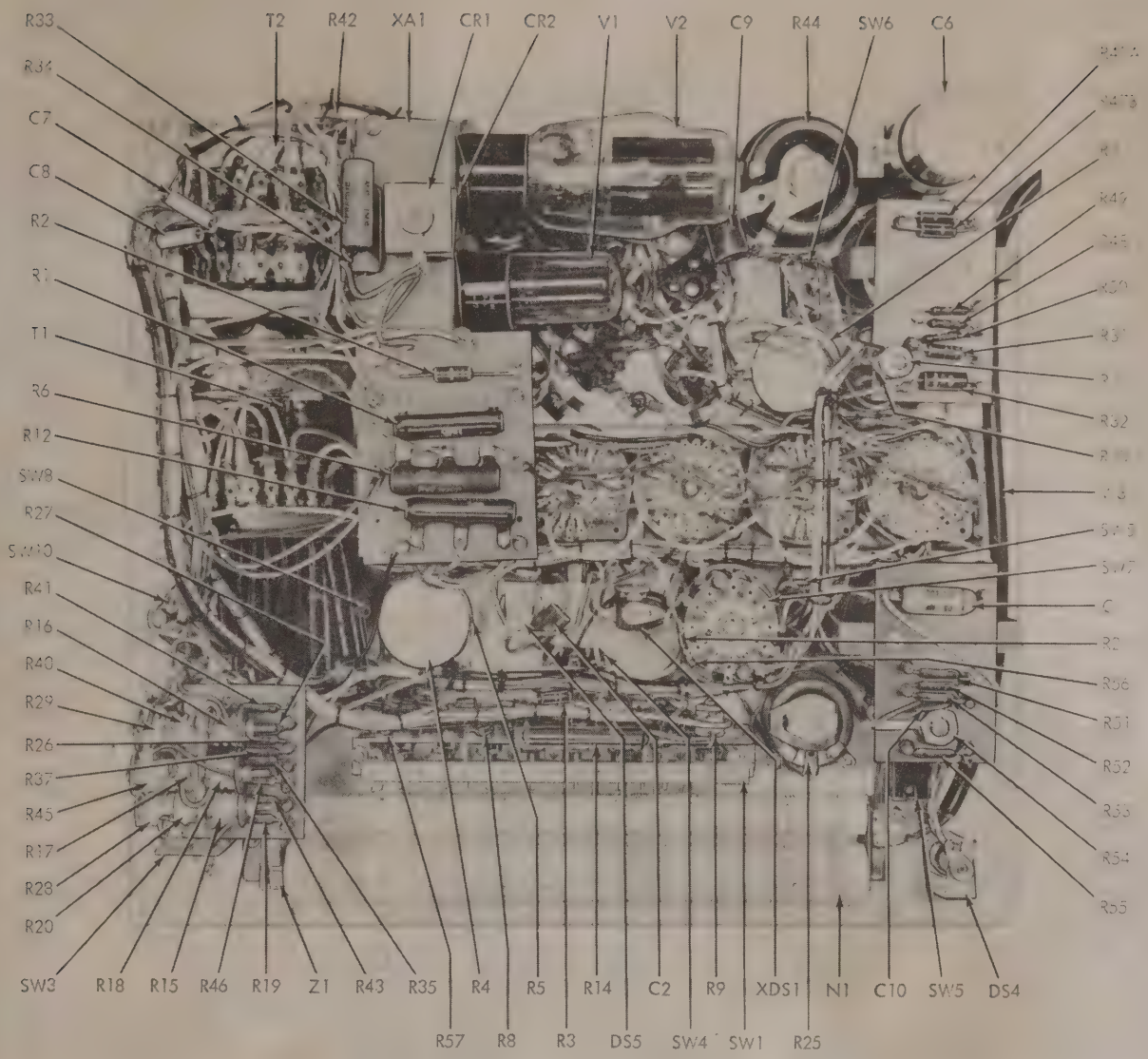
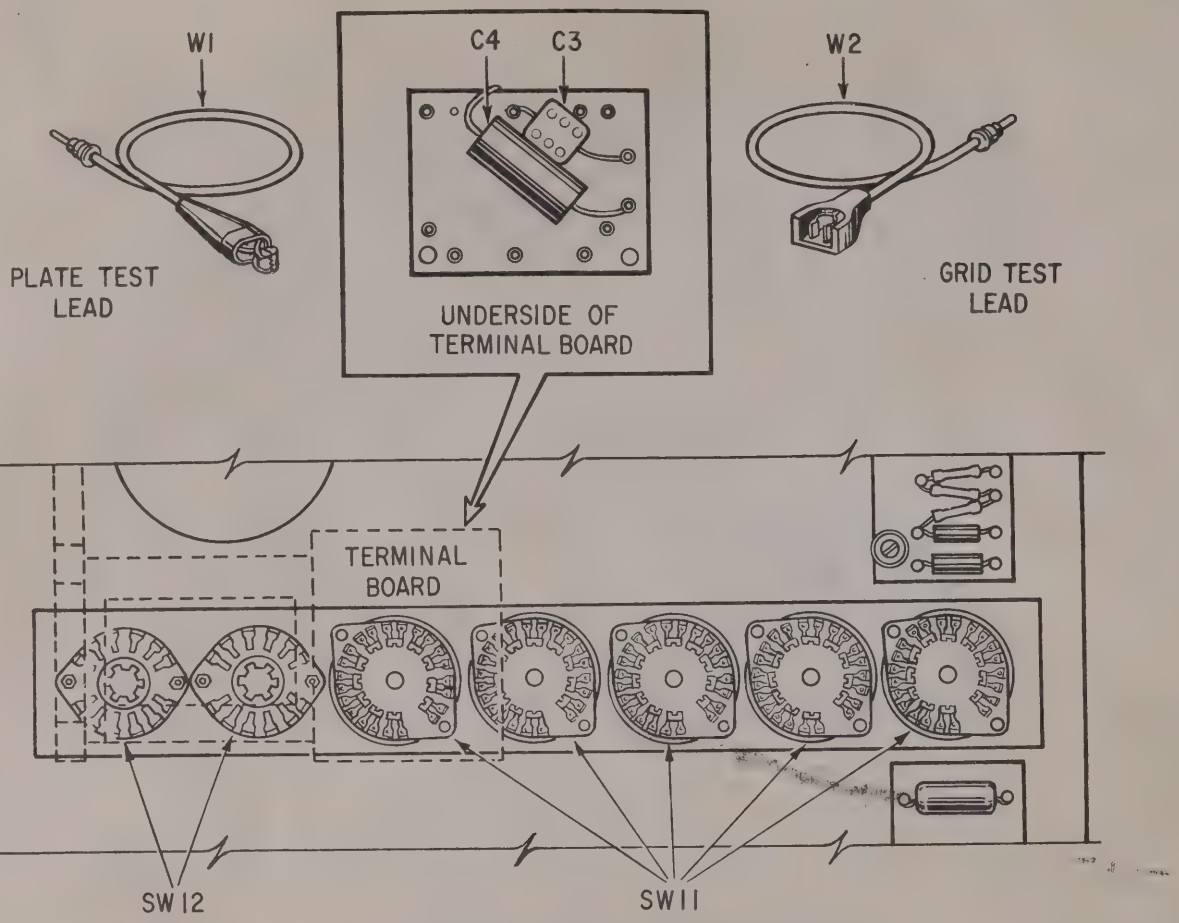
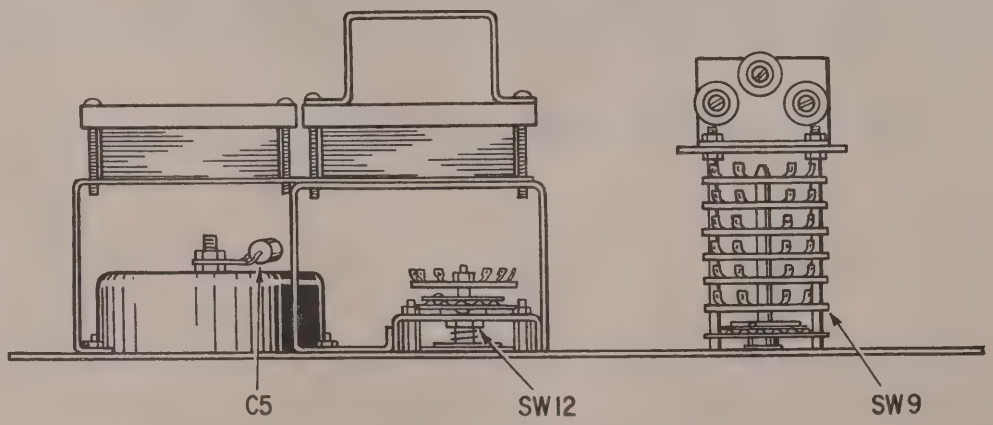


Figure 6. View of Internal Components of Electron Tube Test Set



PARTIAL PLAN VIEW OF INTERNAL COMPONENTS



LEFT SIDE VIEW OF INTERNAL COMPONENTS

Figure 7. Detail Views of Internal Components

REF DESIG SYMBOLS	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
NONE	901-212	TEST, SET, ELECTRON TUBE	1
C1	BP-4-05	• CAPACITOR, Fixed, 0.05 UF, ± 20%, 400 volts (MFD by 82376) (3105-175)	1
C2	MCM20B471K	• CAPACITOR, Fixed, mica, 470 UUF, ± 10%, 500 volts (MFD by 76433) (3095-8)	1
C3	MCM30B272K	• CAPACITOR, Fixed, mica, 0.0027 UFD, ± 10%, 500 volts (MFD by 76433) (3095-41)	1
C4	TVA-1310	• CAPACITOR, Fixed, electrolytic, 100 UFD, 50 volts (MFD by 56289) (3085-44)	1
C5	TVA-1100	• CAPACITOR, Fixed, electrolytic, 50 UFD, 6 volts (MFD by 56289) (3085-45)	1
C6	D15975	• CAPACITOR, Fixed, electrolytic, 2000 UFD, 10 volts (MFD by 56289) (3085-43)	1
C7	KS14060L1	• CAPACITOR, Fixed, 1500 UUFD, ± 1%, 500 volts (MFD by 72125) (3095-50)	1
C8		Same as C7	1
C9	BR835A	• CAPACITOR, Fixed, electrolytic, 8 UFD, 350 volts (MFD by 14655) (3085-68)	1
C10	DA-048-001A	• CAPACITOR, Fixed, 0.005 UFD, 500 volts (MFD by 71590) (3110-7)	1
CR1	1002A	• RECTIFIER, Metallic, selenium type (MFD by 21964) (18150-17)	1
CR2		Same as CR1	1
DS1	81	• LAMP, Incandescent, 6 to 8 volts, 6 candle power, G-6 bulb, single contact small bayonet base (MFD by 94154) (12270-2)	1
DS2	47	• LAMP, Incandescent, 6 to 8 volts, 0.15 amperes, T-3-1/4 bulb, single contact miniature bayonet base (MFD by 24455) (12270-12)	1
DS3	NE-51	• LAMP, Glow, neon type, 105 to 125 volts, 1/25 watt, striking voltage 90 volts DC, 65 volts AC, T-3-1/4 bulb, single contact miniature bayonet base (MFD by 24455) (V5) (12270-14)	1
DS4	19350-112	• LIGHT, Indicator, designed to mount T-3-1/4 bulb, 28 volts working voltage	1
DS5	19350-202	• LIGHT, Indicator, designed to mount T-3-1/4 bulb, 28 volts working voltage	1
H1	4150-99	• DIAL, Control	5
H2	4150-100	• DIAL, Control	1
H3	4150-101	• DIAL, Control	1
H4	4160-66	• DIAL, Control	1
H5	11500-39	• KNOB, Molded, black phenolic	1
H6	11505-46	• KNOB, Molded, black phenolic	7
H7	S-78-3	• KNOB, Molded, black phenolic (MFD by 75376) (11505-49)	2
H8	2920-7	• KNOB, Molded, black phenolic	6
H9	2920-8	• KNOB, Molded, red phenolic	2
H10	11500-11	• KNOB, Molded, black phenolic	4
H11	D7	• STRAIGHTENER, Pin, electron tube for 7 pin miniature tubes, steel, designed to be press-fitted into hole in panel (MFD by 88065) (16277-3)	1
H12	D9	• STRAIGHTENER, Pin, electron tube for 9 pin novel tubes, steel, designed to be press-fitted into hole in panel (MFD by 88065) (16277-2)	1
J1	105-601	• JACK, Tip, single contact (MFD by 74970) (10300-39)	2
J2	7886 BLACK	• JACK, Tip, single contact (MFD by 72825) (10300-2)	3
J3	7886 RED	• JACK, Tip, single contact (MFD by 72825) (10300-1)	1
JA1	938-C	• POST, Binding (MFD by 24655) (2360-51)	1
M1	440-663	• METER, Electron tube tester, "MICROMHOS" indicator, white dial background w/black scale markings	2

REF DESIG SYMBOLS	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
M2	560-813	• VOLTMETER D.C., "grid bias volts" indicating meter, ... two ranges - 0 to 5 volts and 0 to 50 volts	1
M3	570-200	• VOLTMETER A.C., "line voltage" indicating meter, ... 0 to 130 volts range w/red line at 100 volts	1
R1	C10-1800	• RESISTOR, Fixed, wire wound, 1800 ohms, ± 10%, ... 10 watts (MFD by 35434) (18575-12)	1
R2	GB1221	• RESISTOR, Fixed, composition, 1200 ohms, ± 10%, ... 1 watt (MFD by 01121) (18422-122)	1
R3	GB1535	• RESISTOR, Fixed, composition, 15 K ohms, ± 5%, ... 1 watt (MFD by 01121) (18423-151)	1
R4	16926-4	• RESISTOR, Variable, 150 ohms each section, ± 5% each . . . . . section, 4 watts, specially adjusted to ± 1% tolerance between sections	1
R5		Part of R4	
R6	H10-10000	• RESISTOR, Fixed, wire wound, center tapped, 10 K ohms, . . . ± 10% tolerance, 10 watts (MFD by 35434) (18575-101)	1
R7	16925-63	• RESISTOR, Variable, wire wound, 3000 ohms, ± 5%, 4 watts . .	1
R8	EB2035	• RESISTOR, Fixed, composition, 20 K ohms, ± 5%, 1/2 watt . . . (MFD by 01121) (18413-201)	1
R9	18684-113/60	• RESISTOR, Fixed, wire wound, 60 ohms, ± 0.5% tolerance, . . . 1/2 watt	1
R10	18684-119/196	• RESISTOR, Fixed, wire wound, 196 ohms, ± 0.5%, 1/2 watt . . .	1
R11	18684-103/4	• RESISTOR, Fixed, wire wound, 4 ohms, ± 0.5% tolerance, ... 1/2 watt	1
R12	H10-100	• RESISTOR, Fixed, wire wound, center tapped, 100 ohms ± 10%, 10 watts (MFD by 35434) (18575-19)	1
R13		Part of R12	
R14	DC2-151F	• RESISTOR, Fixed, film, 150 ohms, ± 1% tolerance, ... 2 watts (MFD by 19701) (18540-4)	1
R15	18684-125/610	• RESISTOR, Fixed, wire wound, 610 ohms, ± 0.5% . . . . . tolerance, 1/2 watt	1
R16	18684-117/105	• RESISTOR, Fixed, wire wound, 105 ohms, ± 0.5%, 1/2 watt . .	1
R17	18684-114/70	• RESISTOR, Fixed, wire wound, 70 ohms, ± 0.5%, 1/2 watt . . .	1
R18	18684-121/270	• RESISTOR, Fixed, wire wound, 270 ohms, ± 0.5%, 1/2 watt . .	1
R19	DC1/2A451F	• RESISTOR, Fixed, film, 450 ohms, ± 1%, 1/2 watt . . . . . (MFD by 19701) (18537-79)	1
R20	18684-117/109	• RESISTOR, Fixed, wire wound, 109 ohms, ± 0.5%, 1/2 watt. . .	1
R21	EB4715	• RESISTOR, Fixed, composition, 470 ohms, ± 5%, 1/2 watt . . . (MFD by 01121) (18411-471)	1
R22		Deleted from Parts List	
R23		Deleted from Parts List	
R24		Deleted from Parts List	
R25	0214	• RHEOSTAT, 150 ohms, 25 watts, approximately 146 steps . . . (MFD by 73978) (18750-24)	1
R26	DC1/2A801F	• RESISTOR, Fixed, film, 800 ohms, ± 1%, 1/2 watt . . . . . (MFD by 19701) (18537-75)	1
R27	DC1/2A201F	• RESISTOR, Fixed, film, 200 ohms, ± 1%, 1/2 watt. . . . . (MFD by 19701) (18537-76)	1
R28	18684-112/41	• RESISTOR, Fixed, wire wound, 41 ohms, ± 0.5%, 1/2 watt . . .	1
R29		Same as R28	1
R30		Deleted from Parts List	
R31	GB3615	• RESISTOR, Fixed, composition, 360 ohms, ± 5%, 1 watt . . . . . (MFD by 01121) (18421-361)	1
R32	HB2725	• RESISTOR, Fixed, composition, 2700 ohms, ± 5%, 2 watts . . . (MFD by 01121) (18432-271)	1
R33	5KT-4300	• RESISTOR, Fixed, wire wound, 4300 ohms, ± 5%, 5 watts . . . . (MFD by 56289) (18575-153)	1
R34		Same as R33	1
R35	DC1/2A202F	• RESISTOR, Fixed, film, 2000 ohms, ± 1%, 1/2 watt . . . . . (MFD by 19701) (18537-78)	1
R36		Deleted from Parts List	
R37	DC1/2A102F	• RESISTOR, Fixed, film, 1000 ohms, ± 1%, 1/2 watt . . . . . (MFD by 19701) (18537-77)	1

REF DESIG SYMBOLS	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
R38		Deleted from Parts List	
R39		Deleted from Parts List	
R40		Same as R20	1
R41		Same as R19	1
R42	16925-271	• RESISTOR, Variable, 50 ohms, ± 10%, 1 watt	1
R43	DC1/2A2641F	• RESISTOR, Fixed, film, 2640 ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-80)	1
R44	0332	• RHEOSTAT, 10K ohms, 50 watts, approximately 567 steps (MFD by 73978) (18750-26)	1
R45	18684-124/560	• RESISTOR, Fixed, wire wound, 560 ohms, ± 0.5%, 1/2 watt	1
R46	DC1/2A474F	• RESISTOR, Fixed, film, 470K ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-66)	1
R47A	GB1025	• RESISTOR, Fixed, composition, 1000 ohms, ± 5%, 1 watt (MFD by 01121) (18422-101)	1
R47B		Same as R47A	1
R48	DC1/2A492F	• RESISTOR, Fixed, film, 4900 ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-74)	1
R49	DC1/2A453F	• RESISTOR, Fixed, film, 45K ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-36)	1
R50		Same as R27	1
R51	DC1/2A674F	• RESISTOR, Fixed, film, 670K ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-81)	1
R52	DC1/2A513F	• RESISTOR, Fixed, film, 51K ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-82)	1
R53	DC1/2A204F	• RESISTOR, Fixed, film, 200K ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-46)	1
R54	16925-259	• RESISTOR, Variable, 250K ohms, ± 20%, 1/2 watt	1
R55	DC1/2A434F	• RESISTOR, Fixed, film, 430K ohms, ± 1%, 1/2 watt (MFD by 19701) (18537-83)	1
R56	EB1051	• RESISTOR, Fixed, composition, 1 megohm, ± 10%, 1/2 watt (MFD by 01121) (18415-102)	1
R57	EB4731	• RESISTOR, Fixed, composition, 47K ohms, ± 10%, 1/2 watt (MFD by 01121) (18413-472)	1
SW1	19910-117	• SWITCH, Push, 8 section push button gang switch	1
SW2	19910-118	• SWITCH, Push, DPDT, one position momentary	
SW3	16743-78	• SWITCH, Side, DPDT (MFD by 76854) (19911-7)	
SW4	7505K3	• SWITCH, Toggle SPDT, 15 amperes 125 volts AC (MFD by 15605) (19911-19)	
SW5	81027-CB	• SWITCH, Toggle DPDT, 3 amperes 250 volts, 6 amperes 125 volts AC or DC (MFD by 04009) (19911-38)	
SW6	81027-CE	• SWITCH, Toggle DPDT, 3 amperes 250 volts, 6 amperes 125 volts AC or DC (MFD by 04009) (19911-55)	1
SW7	19912-175	• SWITCH, Rotary, "shorts test", 5 sections, 6 positions	1
SW8	19912-202	• SWITCH, Rotary, "filament voltage" selector, 1 section, 20 positions	1
SW9	19912-297	• SWITCH, Rotary, "function" selector, 6 sections, 10 positions	1
SW10	19912-304	• SWITCH, Rotary, "plate-screen voltage normal-low" selector, 1 section, 2 positions	1
SW11	19912-330	• SWITCH, Rotary, "filament,grid, plate and screen" test selectors, 1 section, 12 positions	5
SW12	19912-334	• SWITCH, Rotary, "suppressor and cathode" test selectors, 1 section, 12 positions, no stop	2
T1	20800-103	• TRANSFORMER, Power, step-down, 117 volts input, 50 to 60 cycles, single phase, 117 volts over-all output w/17 taps	1
T2	20800-169	• TRANSFORMER, Power, step-down and step-up, 117 volts input, 50 to 60 cycles, single phase, 6 secondary windings	1
V1	5Y3GT/G	• ELECTRON TUBE, dual diode rectifier (MFD by 86684) (20875-6)	1
V2	83	• ELECTRON TUBE, dual diode rectifier (MFD by 86684) (20875-28)	1

REF DESIG SYMBOLS	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
W1	12450-145	• LEAD, Test, "plate" test connector lead	1
W2	12450-180	• LEAD, Test, "grid", test connector lead	1
W3	GC-2B7	• CABLE ASSY, Power, electrical, 3 wire cable w/three prong plug (MFD by 24457) (for replacement plug use UP121M) (3675-26) . .	1
X1	44C20389	• SOCKET, Electron tube, 9 pin noval type (MFD by 71785) (19350-58)	1
X2	78-S4M	• SOCKET, Electron tube, 4 pin standard (MFD by 02660) (19350-93)	1
X3	78-S5M	• SOCKET, Electron tube, 5 pin standard (MFD by 02660) (19350-94)	1
X4	78-S6M	• SOCKET, Electron tube, 6 pin standard (MFD by 02660) (19350-95)	1
X5	78-7CDM	• SOCKET, Electron tube, 7 pin standard (MFD by 02660) (19350-96)	1
X6	78-8LM	• SOCKET, Electron tube, 8 pin loctal type (MFD by 02660) (19350-97)	1
X7	45C17310	• SOCKET, Electron tube, 9 pin wafer type (MFD by 71785) (19350-135)	1
X8	19350-220	• SOCKET ASSY, Electron tube, 7 pin sub-miniature in-line and 8 pin sub-miniature sockets on common mounting plate	1
X9	53C14558	• SOCKET, Electron tube, 7 pin miniature type (MFD by 71785) (19350-236)	1
X10	51E17570	• SOCKET, Electron tube, 8 pin octal type (MFD by 71785) (19350-237)	1
X11	1050-39	• SOCKET, 8 pin octal type socket saver	1
X12	1050-40	• SOCKET, Replaceable, 9 pin noval type socket saver	1
XA1	2660-496	• SOCKET ASSY, Electron tube	1
XDS1	B-614-H-CH	• LAMPHOLDER, Single contact small bayonet base type, 125 volts nominal voltage (MFD by 72765) (19350-1)	1 1
Z1	9600-38	• ROLL, Chart assembly	1
N1	3200-54	• • CHART, Data roll, printed roll chart w/information for testing electron tubes . .	1
X13	1050-41	• SOCKET, Replaceable 7 pin miniature type socket saver	1